Research on the improvement path of primary school teachers' instructional design ability under deep learning theory

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Abstract: *Instructional design is a scheme for teachers to spread knowledge to students, and deep learning is a means to ensure the quality of teaching. However, it is easy to cause problems of chaotic teaching target design, overall teaching content design, compact teaching process design, and preliminary teaching reflection design due to the particularity of pupils when teachers carry out teaching design. Hence, teachers should carry out teaching design from four aspects: straight-forward teaching objective design, diversified teaching content design, detailed teaching process design, and teaching reflection design suitably under the theory of deep learning. Students can control their learning process through purposive, autonomous learning guided by teachers.*

Keywords: *Deep learning; Primary school teacher; Teaching design*

1. Introduction

Deep learning is an inevitable choice for teaching reform in the 21st century, just like a weathervane for the development of The Times. Pupils' bodies and minds are in the development process; the individual learning process is their development process. Teachers need to pay attention to the feeling of students, especially in education and teaching activities, paying attention to the individual initiative of students. Deep learning is proposed due to mechanical learning and surface learning, which further changes students' prior knowledge based on their daily experience and knowledge concepts acquired in other situations. The so-called "depth" not only requires abandoning the surface learning of learning by machine and rote memorization in teaching practices, but also requires promoting the formation of students' advanced cognition and forming of high-level thinking. Then it can be used to cultivate the all-round development of people. Therefore, in the education sense, in addition to focusing on improving students' learning methods and thinking ability, deep learning also focuses on the evolution of students' educational values. That is, it is not only necessary for students to learn essential knowledge and master key abilities, but also to cultivate students' discipline quality and realize the value pursuit of developing subject quality and realize the value pursuit of cultivating morality and developing people. Based on deep learning theory, it is beneficial to improve the professional quality of primary school teachers, and to make it play a leading role in the teaching practice. Besides this it can be used to ensure the effectiveness of the learning activities, and to promote the students' personality development by exploring the ascension path of teaching design ability about designing teaching target and teaching reflection, teaching content, and teaching process design.

2. Concept definition

In 1970, Ference Marton and Roger Saljo formally proposed the concept of deep learning according to the way learners acquire and process information,which means the process of students' acquisition and development under the guidance of teachers and total involvement.[1] Teachers' teaching design guided by deep learning theory can improve students' thinking ability, master methods, and cultivate core literacy. With "deep learning" and "instructional design" as the primary keywords, instructional design mainly includes four keywords: teaching objective design, instructional content design, instructional process design, and thoughtful instructional design. Defining the concepts of these keywords has a supportive role in the view of this paper.

2.1 Deep learning

Different researchers have defined the concept of deep learning from different dimensions and perspectives. First, deep learning is defined from the perspective of learning transfer. For example, according to the National Research Council, in the "Definition of Deep Learning and skills in the 21st-century committee" entitled "Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st-century, " the report, the depth; the learning is a process of knowledge transfer, it allows students to apply their existing situational knowledge to new and other situations.[2] Second, learners are regarded as life-long creators, and the definition of deep learning is explained from the perspective of the competence and literacy that problem solvers should possess. In the book Deep Learning: Participate in the World, Change the World, Michael Fullan et al. define deep learning as a set of skills called "6C", which specifically include Character, Citizenship, Communication, critical thinking and problem solving, Collaboration, and Creativity and ima-Galion.[3] The third is to explain deep-learning is from the perspective that learners can understand the learning content. In the " Understanding by Design " project hosted by American scholar Grant Wiggins and others, "understanding" is divided into six different dimensions, including interpretation, paraphrasing, use, insight, empathy, and self-knowledge. Each dimension has a detailed description of the requirements that students can achieve after learning.[4] Fourth, based on the nature of knowledge and learning, deep learning aims at learners' high-level cognition of knowledge and achievement of higher-order thinking from the perspectives of learning results, learning methods, learning objectives, and learning processes. Marton & Saljo emphasize the deep processing of information and believe that deep learning is the understanding of content and the connecting of new knowledge with existing knowledge and experience.[5] Deep learning refers to a learning method in which students, under the guidance of teachers, apply high-level cognitive learning skills to solve practical problems, obtain profound basic knowledge, and achieve a deep cognitive state.

2.2 Teaching design

Different scholars have defined instructional design from different aspects, either from the perspective of the process or from the characteristics of the system. Instructional design is a technical process of creating learning experiences and environments that can improve the efficiency and interest of students in acquiring specific knowledge and skills. First, K.L. Gustafson pointed out that instructional design is analyzing teaching content, determining teaching methods, guiding experiments and modifications, and evaluating learning.[6] Second, J.V. Patten pointed out that instructional design is a member of the big family of design science. The common feature of all members of design science is to use scientific principles and applications to meet the needs of human beings. Therefore, instructional design is the process of designing solutions to performance problems.[7] Third, R. Richey believes that instructional design is the science of detailed planning to develop, evaluate, and maintain learning situations to facilitate learning in subject units of different sizes. In general. Teachers transform curriculum into activities, assignments, and tasks for students through instructional design.[8] Once a teacher has developed a lesson plan, they will try to incorporate it into all the learning materials and activities of the students. The teaching design of this paper includes teaching objective design, teaching content design, teaching process design and teaching reflection design.

3. The dilemma of teaching design for primary school teachers

When primary school teachers carry out teaching design under the traditional teaching mode, there are often some problems, such as chaotic teaching objective design, overall teaching content design, compact teaching process design, preliminary teaching reflection design, and lack of in-depth teaching design.

3.1 The design of teaching objectives is chaotic

Establishing classroom teaching objectives is the starting point and critical point of teaching design. Pupils are still in the stage of cognitive development, and lack specific basic knowledge. When designing teaching objectives, teachers can not accurately locate cognitive goals, emotional goals, and motor skills goals in combination with the physical and mental development characteristics of primary school students. As a result, only a few students can take the initiative to communicate with teachers, and the interaction between teachers and students is insufficient to achieve a cognitive state. Primary school students have active thinking and are quick to accept new things. However, they do not invest enough

time and energy in in-depth knowledge mining, and the knowledge they master is not systematic, so it is challenging to feel emotional expression, and thus it is difficult to achieve deep learning.

3.2 Broad design of teaching content

In general, primary school students are unfamiliar with the main points of specific knowledge and come to class with what little life experience they have. Although the teaching content of each subject in primary school is relatively basic, the inside is pretty simple. For example, the direct mathematical knowledge is generally through analysis, and calculation to get the correct results, and direct Chinese knowledge is usually learning to recite poems. However, in primary school, there are many subjects to learn, and the content is broad. The content of in-depth teaching is complex. Only teachers teach, and students listen to each other, which makes it difficult for students to understand. It is often difficult to understand, and most students lack interest in learning. Moreover, the self-control ability of primary school students is not strong, and the time for autonomous learning is less. With time, knowledge doubts and blind spots will accumulate, and students will not have a state of deep understanding. In severe cases, they may have a mental state of weariness of knowledge.

3.3 The teaching process design is compact

In primary school, there are many teaching contents each semester, and the class hours are tight, so teachers cannot spend more time in class for action explanations. Students rely on rote learning for their final exams. This kind of shallow level learning causes many important knowledge points to be easily forgotten or produce cognitive deviation. In the teaching process, it is difficult for teachers to take students as the center and develop diversified teaching methods. No attention is paid to the personalized development of students. Teaching is carried out by a fixed model. Students have little knowledge of the teaching content, and the effect of deep learning is not achieved, so their quality is not improved.

3.4 Teaching reflection design is not complete

Teaching reflection is the essence of teachers in the activities, through the analysis of targeted teaching phenomenon, revealing the hidden behind the teaching behavior of the various problems in teaching ideas, and finding the common difficulties in students learning behavior, and then around these issues research, multi-side multi-angle reflection, capture the typical difficulties of teaching actively, attentively understanding and reflection, reflection can have Depth. The vast majority of primary school teachers have a deviation in understanding, teachers heavy workload, and no time reflect on teaching seriously. To cope with the examination, teachers usually passively reflect on education, which is realized by the reflection after education, but rarely reflect before teaching and reflect during schooling. In addition, teachers' teaching reflection is mainly the description of the teaching process, with a high proportion of accurate description and few comprehensive analyses and in-depth thinking. In addition, teachers' teaching reflection mainly to describing the teaching process, including the success and the deficiency. The same problem appears many times in different reflections, and there is a lack of in-depth excavation, and there are many empty words and stereotypes. Therefore, it is difficult to instantly understand students' learning effects through teaching reflection in the process of teaching, teaching, to make adjustments to related teaching contents, and teaching methods, and it is also difficult to achieve deep learning.

4. Ways to improve the teaching design ability of primary school teachers

Deep learning is the study and evaluation of learning levels. It pursues a change of focus in the learning process. It not only pays attention to the knowledge, pays attention to not only the knowledge itself, but also guides and strengthens the thinking mode and application ability. Primary school teachers under the deep learning theory, dialysis from straightforward teaching goal design, teaching content design, looked into the teaching process design, multivariate design aspects such as teaching design, teaching reflection in the classroom to play the role of guidance, coordination, and evaluation, stimulate students' learning interest and motivation, let the student obtain the corresponding knowledge, emotion, and skill.

4.1 Clear design of teaching objectives

A clear teaching objective has three main benefits. First, clear teaching objectives can promote students' learning, help students pay attention to crucial information, help students understand the meaning of learning, and stimulate students' learning motivation. Secondly, teaching objectives guide teachers' teaching and students' learning, and they can promote behavior and communication in class. Through teaching objectives, teachers can make teaching adjustments according to students' needs to select and create ways that help students acquire essential knowledge. Finally, clear learning objectives help to evaluate and test learning. If the teacher knows the learning objectives in advance and the students know the learning standards, the teaching process will be easy and effective, and it will be easier to evaluate the performance of the students and the teaching effect of the teacher.

In teaching, different goals need to be set at the same time. Bloom divides teaching goals into three types: cognitive goals, affective goals, and psychomotor goals. Mental goals include knowledge, understanding, application, analysis, synthesis, and evaluation of six levels; for each kind of teaching content, these goals can be set, even can be arranged at all levels of goals.[9] For different cognitive goals, other methods can be selected for testing. Emotional goals include five primary goals: acceptance, reaction, formation of value concept, organizational value concept system, and individuation of value system. In setting a specific goal, the teacher must state what the students have learned in their acceptance and response. In evaluating emotional goals, these goals can be used as diagnostic criteria before the class to see what value system students bring to the course, which can help them evaluate the evaluation after class. The motor skills goals include perception, imitation, manipulation, accuracy, coherence, and habituation. The achievement of this goal reflects the development of specific performance abilities. Teachers should fully understand the students' cognitive level and ability to understand current, based on the teaching content, to stand in the Angle of the development of students to develop different teaching goals, let students experience the formation process of "knowledge," make the teaching design of major discipline thinking characteristics, allow students reach the state of the deep learning and ensure students on objective learning ability to achieve the teaching goal, as well as the subjective move Be sexually willing to achieve teaching objectives. The scientific teaching goal is planning; exquisite teaching design is the blueprint.

4.2 Dialysis teaching content design

The knowledge types of teaching content design are generally divided into the following three categories. One is declarative knowledge. When teaching declarative knowledge, the creation of teaching content should focus on helping students understand and acquire such knowledge, as well as their grasp of its relevance or meaning. In the specific design process, teachers should carefully analyze students' willingness to learn, consider students' existing knowledge, find the connection between new knowledge and existing knowledge, and explain the relationship between the two to help students understand. The second is procedural knowledge, the knowledge about the application method. The formation of procedural knowledge in teaching mainly involves recognizing and developing students' skills in solving problems using concepts, rules, and principles. The teaching design of procedural knowledge should have a sufficient experiment and practice structure. Through specific tasks, students can think deeply and apply the newly learned rules in solving problems, to respond immediately when the corresponding situation occurs. In short, when designing to teach such knowledge, teachers should create teaching practice time to effectively ensure the absorption of rules and concepts and the development of problem-solving abilities in classroom teaching. The third is strategic knowledge. The main difference between it and procedural knowledge is that it deals with the individual's cognitive activities and the knowledge that the individual adjusts to his mental activities. Such knowledge is acquired through studying various actions, without specific subject content. When designing this kind of knowledge, teachers should first learn and master the knowledge about learning strategies and cognitive strategies, strengthen the preparation of strategy teaching training, pay attention to the strategic knowledge content in the course, and carry out targeted teaching design based on the characteristics of strategic knowledge and students' learning characteristics.

Different teaching contents require different strategies for teaching design. In a word, the teaching content organized by teachers should be combined with a logical order and psychological order, and the internal logic system of the knowledge system should be consistent with the inner cognitive law of students' learning activities, to avoid students' simple learning knowledge points and incomplete understanding. In the design of teaching content, teachers should select relevant and appropriate content and delete inappropriate teaching content. The purpose is to develop students' thinking and enlighten

students' consciousness. It emphasizes the educational concept of deep construction of knowledge structure and creates necessary conditions for students' deep learning.

4.3 Study the design of the teaching process

The teaching process is a particular cognitive process. Under the targeted, organized and planned guidance of teachers, students, take the initiative to acquire systematic basic knowledge and skills of culture and science, develop their abilities and improve their physique. At the same time, teachers and students carry out a particular ideological and moral exchange. To ensure the acquisition of knowledge and skills specified in the textbook, before the teaching process, teachers should carefully prepare the best teaching process, scientifically organize and plan the teaching content and methods, and select and design the appropriate teaching process. In the process of teaching, according to the proposed design system, combined with the current situation, the new scheme can be modified and implemented. The teaching process is the main body of teaching design, which generally includes five links: review and questioning, introducing new courses, teaching new techniques, summarizing and summarizing, and homework. When designing the teaching process, these aspects should be focused and slightly detailed. Training time is an essential factor affecting teaching activities. School teaching activities always occur in a relatively fixed period, so to maintain and adjust the teaching practice is to control and change the teaching activities to a certain extent. In the planning of teaching time, teachers should pay attention to the overall allocation of time and provide students with actual learning time. The effective duration of learning varies with students' daily learning ability. To avoid the loss of teaching time, teachers must understand every link in the teaching design process, carefully design every content, and have specific predictions and psychological preparation for the possible problems and their solutions in the classroom. When choosing teaching methods and teaching tools, we should not only consider the actual needs of specific learning tasks, but also comprehensively consider the age characteristics of primary school students, stimulate students' interest in learning, give full play to their learning potential, and create conditions for students' deep learning. The teaching process is the bridge to achieving the teaching goal. It answers the question of "how do students learn" to achieve the purpose of deep learning, and is a sense-inquiry learning activity based on understanding. Various concepts and theoretical knowledge in teaching are complicated. How to sort out this knowledge and guide students to build their knowledge structure system is an essential link in deep learning. One is to create real problem situations. It implies that teachers transform objective facts and situational materials It means that teachers transform objective facts and situational materials that are related to subject teaching, students' life, and students' experiences into teaching situations. Which related to subject teaching, students' life and students' experiences in teaching situations. The real problem situation can not only activate the classroom atmosphere, effectively attract students' attention, and stimulate students' interest in learning, The real problem situation cannot only activate the classroom atmosphere, effectively attract students' attention, stimulate students' interest in learning, but also encourage students to actively complete the construction of knowledge. They encourage students to actively complete the construction of knowledge. Second, equal dialogue, collaborative inquiry and interactive communication between teachers and students are the bonds to promote deep learning. In the process of teaching, teachers need to carefully design rich contexts to guide students to carry out active and effective communication, discussion and communication. Especially in experimental teaching, students should strengthen cooperation and communication while allowing them to practice. The student-oriented activities are not only beneficial to the improvement of students' discipline quality, but also beneficial to the cultivation of students' scientific spirit and social responsibility.

4.4 Multiple teaching reflection designs

In the teaching process, teachers mainly reflect on teaching practice, personal teaching experience, teaching relationship and teaching theory, which are also the main dimensions of teaching reflection. First, teaching practice reflection refers to the summary and overview of the appropriateness of the tools, methods and time arrangements in teaching activities. Second, there are two levels of reflection on personal teaching experience. One is to reflect on one's daily teaching experience and make it an authentic experience. The other is to interpret experience and grow. Thirdly, the reflective teaching relationship is significant in the meditative teaching activity, which can be reflected from three perspectives: cognition, knowledge, and value. Fourth, teachers reflect on teaching theories. To have a deeper understanding of the ethics, values, models, and techniques of teaching theories, and make decisions and choices based on them. Of course, no teaching theory is consistently efficient. To improve students' learning ability, teachers should also consciously encourage students to reflect on the process of solving a problem and

think about the similarities and differences between this problem and previous problems, which will help students learn and understand new knowledge.

The instructional reflection design provides students with continuous and clear feedback on their deep learning activities and helps students improve the learning process, including setting standards and giving feedback. This is an important method to enhance teaching levels and guarantee teaching quality. The result of deep learning is not only the mastery of knowledge, but also the development of ability, thinking, and the formation of core literacy. Therefore, multiple instructional reflection designs can be used to promote deep learning and capture the natural learning state. Combined with the actual situation of primary school students, teachers use diversified teaching reflection design to let teachers and students understand the true value of deep learning, give a scientific and reasonable comprehensive evaluation of the learning process of students, and form a virtuous circle of brave attempt and active participation.

5. Conclusions

In summary, teachers act as the organizer of students' learning, the supervisor of the learning process and the instructor of solving problems. Deep implementation of the design concept of goal, content, process and reflection in teaching courses can significantly improve the efficiency and quality of teaching. While carrying out teaching courses, deep learning has better cultivated students' thinking, learning and practice habits. Therefore, teachers should integrate the theory of "deep learning", pay attention to the "redesign" of teaching, adhere to the concept of student-centered and teacher-led, and effectively improve the pertinence of teaching design to lay a solid foundation for students' knowledge accumulation and personality cultivation.

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